3 WEST VIRGINIA 8 HARDY.

FIELD APPRAISAL ANALYSIS

---

Prepared by
Program Analyst
Office of the Administrator
RURAL ELECTRIFICATION ADMINISTRATION

---

Field Appraisal
Completed in
November 1951

**********
**********
******
**

January 31, 1952

Program Analyst
Office of the Administrator

# ANALYSIS OF BASIC FACTORS RELATED TO THE RURAL ELECTRIFICATION LOAN FOR WEST VIRGINIA 8 HARDY

## SUMMARY AND CONCLUSION:

### Ultimate Number of Consumers

1. A recent unelectrified farm survey made of the Hardy County Power and Light Association, Inc., indicated that there are approximately 150 potential consumers remaining to be served. Sixty of these have already been signed. In August 1951 there were a total of 653 connected consumers. Thus, it is estimated that the ultimate number of consumers to be served by this system is about 800. Of these it is further estimated that 450 will be farm, 200 nonfarm residential and 150 small commercial consumers. The potential consumers contacted in this study appeared to be as good or better future users of electricity than the average residential consumer already receiving service.

### Future Consumption of Electricity

The future consumption of electricity by the various classes of consumers in this cooperative depends upon the many economic factors discussed in the body of this analysis. The more important of these are enumerated below and an estimate of future kwh consumption by class of consumer is made.

1. Served farm consumers interviewed in the survey indicated an average of 203 kwh per month to be attained within a 3-year period. Served nonfarm residential consumers indicated an average of 101 kwh per month to be attained, and unserved consumers, composed of farm and nonfarm residentials, indicated an average future use of 91 kwh per month.

2. The indications as to future usage show that 75 percent of the nonfarm residential consumers, and 50 percent of the farm consumers, will use less than 100 kwh per month within a 3-year period.

3. Farm consumers constitute approximately 73 percent of all consumers in this system. Since 1947, they have been increasing in average kwh usage at about 7 kwh per year. Prior to that time the increased use of electricity was discouraged by frequent outages. Low voltage has been cited by some consumers in the area as one cause for the slow increase in average consumption. Billing records of a random sample of consumers who were first connected on this system indicates that for 1950 they were using an average of 142 kwh per month.

4. Water heating will account for nearly 21 percent of the total future farm consumer load, while of greatest importance for nonfarm consumers is refrigeration, which will account for more than 30 percent of the total load for this class of consumer.

5. Thirteen percent of the respondents in the survey indicated they were using Liquid Petroleum gas for one or more purposes. It is expected that little change will take place in LP gas usage in this area.

6. Seventy-five percent of the 6 million dollar income to farmers in Hardy County during 1951 came from brooding chicks and poults. If this cooperative can establish a reputation of minimum outages and adequate voltage the appraiser definitely feels that loads could be materially increased through use of electricity for brooding. Local people are inclined toward electric brooding since they maintain that it is a steady heat and does not cause condensation that would otherwise result in damp litter and heavy losses.

7. There were 1,124 farms in Hardy County on April 1, 1950. This was a 15 percent decrease under 1945. Farms average nearly 200 acres. In 1949, only 10 percent of the land in farms was used to produce crops. The cropland lies in the valleys. Most of the farm land in this county is grazed or is in timber. In 1945 farm land was valued at $35 per acre, which was 36 percent above the average value for the State. The average cash farm income was 5,307 dollars for 1949. Although this was considerably above the State average, nearly one-third of Hardy County farmers had income of less than 1,500 dollars. In 1950, 70 percent of the county's farms were electrified; 31 percent had telephones. Marketing facilities are adequate, but in wet weather many farmers have difficulty transporting products to the all-weather roads from their farmsteads which, in some cases, are as many as 10 miles apart.

8. Based on all factors believed to be significant, the following kwh estimates are certified as being reasonable.

| Class of Consumer | 12 Months Ended October 1951 | 1954 | 1957 | 1962 |
|---|---|---|---|---|
| Farm ) | 90 | 140 | 175 | 250 |
| Nonfarm residential ) | | 75 | 100 | 150 |
| Small commercial | 98 | 175 | 220 | 275 |

E. C. Weitzell
Program Analyst

## I. LOCATION

The Hardy County Power and Light Association, Inc., serves Hardy County, including short extensions into Hampshire, Pendleton and Grant Counties, West Virginia.(See Figure I.) Although a provisional headquarters office is maintained in Moorefield, West Virginia for paying electric bills, reporting service needs, and for the transaction of other business by the directorate and members of the cooperative, much of the business pertaining thereto is directly or indirectly disposed of through the Shenandoah Valley Electric Cooperative, Inc. (Virginia 11 Rockingham) at Dayton, Virginia. This tie is the result of a 5-year operating agreement consummated on December 18, 1948.

## II. SOURCE OF DATA USED IN THIS ANALYSIS

The data that serve as a basis for this analysis were obtained during a visit to the cooperative's area in November, 1951. Richard G. Schmitt, Jr., Assistant Program Analyst, Office of the Administrator, performed the field survey. Facts and figures used herein that were not obtained in the field are primarily from the 1950 Census of Agriculture and relate to Hardy County unless otherwise specified.

The field survey included visits to 67 consumer units and is a random sample of approximately 8.5 percent of the ultimate consumers to be served in the cooperative's area. A total of 52 interviews with served consumers were secured. Thirty-six of these were farm consumers. The other 16, although classified by the cooperative as farm, were actually nonfarm residential consumers. In addition to schedules taken on served consumers, a total of 15 schedules were taken for potential farm and nonfarm consumers, some of which were signed.

## III. ULTIMATE NUMBER OF CONSUMERS TO BE SERVED BY THE SYSTEM

The August 1951 operating report indicated a total of 653 connected consumers, 607 of which were being served. Five hundred of these 607 consumers were classified as farm. The remaining 107 were small commercial and included schools, churches, camps and other nonresidential establishments in the service area.

An unelectrified farm survey was completed in May 1951 which indicated a total of 250 establishments remaining to be served. McWhorter, Robinson and Moody of Staunton, Virginia, were the engineers who performed the survey. Because of the location of some of the potential consumers, the cooperative believes that the Potomac Light and Power Company, which also operates in Hardy County, is likely to serve them. Considering this, the cooperative estimates that there are approximately 150 potentials remaining, 60 of whom have already been signed. Thus, it is expected that the ultimate number of consumers to be served by this cooperative will be about 800.

## IV. INDICATED AVERAGE KWH CONSUMPTION TO BE ATTAINED WITHIN THREE YEARS AFTER THE FIELD APPRAISAL, BY CLASS OF CONSUMER

### A. Procedure

The indications of kwh consumption are based on data obtained through interviews with the various classes of consumers in the system area who were selected by random sample from tabular lists. Of the 67 respondents interviewed, 36 were served farm, 16 served nonfarm, and 15 were potential farm and nonfarm consumers. The distinction between farm and nonfarm was determined by applying the 1950 Census of Agriculture definition at the time of the survey.

The field appraiser called at the home of each of the respondents and was able to obtain a complete and usable schedule (AL-76R) for all of them or a substitute in the few cases where this was necessary. Each respondent having electric service was asked to indicate the electrically operated equipment and household appliances he was already using and in addition, those he would add in 3 years. In the case of respondents without electric service at the time of the interview, they were asked to indicate the equipment and appliances they would use within 3 years after receiving electric service, assuming electric service would be made available to them within a comparatively short time.

Data obtained by these interviews were tabulated, and the percentage of appliance density in relation to all consumers making up the sample was calculated. Average kwh consumption per 100 consumers was computed as the summation of the products of the respective appliance densities per 100 consumers and the average annual energy requirements which assumes average use of appliances and equipment.

### B. Respondents' Indications of Future Consumption

The kwh consumption indications by class of consumer are summarized in Table I. For detail from which this summary was computed, refer to Tables II and III.

TABLE I

SUMMARY OF INDICATED KWH CONSUMPTION

| | Indicated Consumption to be Attained Within Three Years 1/ | | | | | |
|---|---|---|---|---|---|---|
| | Equipment On Hand | | Equipment To Be Purchased | | Total | |
| | Yearly | Monthly | Yearly | Monthly | Yearly | Monthly |
| 1. Farm Consumers | | | | | | |
| Served | 1,988 | 166 | 443 | 37 | 2,431 | 203 |
| 2. Nonfarm Consumers | | | | | | |
| Served | 1,042 | 87 | 174 | 14 | 1,216 | 101 |
| 3. Potential Farm and Nonfarm Consumers | | | | | | |
| Unserved 2/ | -- | -- | 1,091 | 91 | 1,091 | 91 |
| 4. Weighted Averages | | | | | | |
| All classes of consumers | 1,317 | 110 | 524 | 44 | 1,841 | 154 |

Source: Field appraisal completed in November 1951.

1/ These indications assume that (a) consumers will use electricity at the same rate as the average kwh usage determined by REA for farm and home use of electrical appliances and equipment, and (b) that the appliances and equipment which were indicated to be purchased will be in use 3 years after the field appraisal by consumers not now receiving service, as well as those now receiving service.

2/ Indicated consumption for appliances and equipment to be purchased within 3 years after being connected by respondents not now receiving service. Since it is not likely that all the unserved respondents will be connected immediately, the actual time required to attain the indicated consumption will depend upon when connections are made.

## TABLE II

## PERCENT OF SERVED FARM CONSUMERS USING AND PLANNING TO USE ELECTRICAL APPLIANCES AND EQUIPMENT, APPLIANCE DENSITY, AND INDICATED ANNUAL KWH USAGE PER 100 FARM CONSUMERS WITHIN THREE YEARS AFTER THE DATE OF THE FIELD APPRAISAL

| Appliance or Equipment | Percent of Consumers Using (1) | Planning To Use (2) | Using and Planning To Use 1/ (3) | Annual Kwh Usage Per Unit 2/ (4) | Indicated Annual Kwh Usage Per 100 Farm Consumers: Present Use (5) | Future Use (6) | Total Indicated Future Use 3/ (7) |
|---|---|---|---|---|---|---|---|
| MAJOR USES: | | | | | | | |
| House Lighting | 100.0 | --- | 100.0 | 240 | 24,000 | --- | 24,000 |
| General Barn Lighting | 25.0 | 8.3 | 33.3 | 24 | 600 | 199 | 799 |
| Dairy Barn Lighting | 3.0 | 3.0 | 6.0 | 35 | 98 | 98 | 196 |
| Poultry Laying House Lighting | 47.0 | 17.0 | 64.0 | 35 | 1,652 | 585 | 2,237 |
| Yard Lighting | 20.0 | 3.0 | 23.0 | 18 | 349 | 51 | 400 |
| Iron | 100.0 | --- | 100.0 | 100 | 10,000 | --- | 10,000 |
| Radio | 94.0 | 3.0 | 97.0 | 100 | 10,280 | 280 | 10,560 |
| Refrigerator | 88.0 | 3.0 | 91.0 | 360 | 32,004 | 1,008 | 33,012 |
| Range | 20.0 | 6.0 | 26.0 | 1,200 | 23,280 | 6,720 | 30,000 |
| Washing Machine | 88.0 | 6.0 | 94.0 | 35 | 3,112 | 192 | 3,304 |
| Pres. System-Lift 22' or Less | 11.1 | 8.3 | 19.4 | 180 | 1,998 | 1,494 | 3,492 |
| Pres. System-Lift Over 22' | 22.0 | --- | 22.0 | 240 | 5,328 | --- | 5,328 |
| Space Heater (Supplementary) | 6.0 | --- | 6.0 | 70 | 392 | --- | 392 |
| Freezer (Cabinet) | 11.0 | 6.0 | 17.0 | 900 | 9,990 | 5,040 | 15,030 |
| Television Receiver | --- | 3.0 | 3.0 | 360 | --- | 1,008 | 1,008 |
| Water Heater | 8.3 | 8.3 | 16.7 | 3,000 | 25,200 | 24,900 | 50,100 |
| Welder | 6.0 | --- | 6.0 | 75 | 420 | --- | 420 |
| Feed Grinder or Roller | 3.0 | 3.0 | 6.0 | 500 | 1,400 | 1,400 | 2,800 |
| Brooder - Hover | 3.0 | --- | 3.0 | 1,850 | 5,180 | --- | 5,180 |
| Brooder-Battery | 3.0 | --- | 3.0 | 10,000 | 28,000 | --- | 28,000 |
| OTHER LIGHTING: | | | | | | | |
| Poultry Brooder House | 11.0 | 8.0 | 19.0 | 5 | 56 | 41 | 97 |
| Milk House | 3.0 | --- | 3.0 | 35 | 98 | --- | 98 |
| Garage | 3.0 | --- | 3.0 | 8 | 22 | --- | 22 |

| Appliance or Equipment | Percent of Consumers Using (1) | Planning To Use (2) | Using and Planning To Use 1/ (3) | Annual Kwh Usage Per Unit 2/ (4) | Indicated Annual Kwh Usage Per 100 Farm Consumers: Present Use (5) | Future Use (6) | Total Indicated Future Use 3/ (7) |
|---|---|---|---|---|---|---|---|
| OTHER LIGHTING: (Cont'd) | | | | | | | |
| Bunk House | 3.0 | --- | 3.0 | 15 | 42 | --- | 42 |
| Cave or Spring House | 3.0 | --- | 3.0 | 5 | 14 | --- | 14 |
| Other Buildings | 6.0 | --- | 6.0 | 12 | 67 | --- | 67 |
| OTHER HOUSEHOLD USES: | | | | | | | |
| Sewing Machine | 8.3 | --- | 8.3 | 10 | 83 | --- | 83 |
| Household Fan | 11.0 | --- | 11.0 | 15 | 166 | --- | 166 |
| Exhaust Fan (Kitchen) | 3.0 | --- | 3.0 | 15 | 42 | --- | 42 |
| Vacuum Cleaner | 30.6 | 5.5 | 36.1 | 20 | 612 | 110 | 722 |
| Heating Pad | 22.0 | --- | 22.0 | 3 | 67 | --- | 67 |
| Oil Furnace | 3.0 | --- | 3.0 | 300 | 840 | --- | 840 |
| Hot Water Cir. Pump | 3.0 | --- | 3.0 | 120 | 336 | --- | 336 |
| Hot Plate | 25.0 | --- | 25.0 | 70 | 1,750 | --- | 1,750 |
| Percolator | 11.0 | --- | 11.0 | 60 | 666 | --- | 666 |
| Roaster | 3.0 | --- | 3.0 | 480 | 1,344 | --- | 1,344 |
| Toaster | 55.6 | 2.7 | 58.3 | 35 | 1,946 | 95 | 2,041 |
| Waffle Iron | 8.3 | --- | 8.3 | 25 | 208 | --- | 208 |
| Food Mixer | 19.4 | 2.8 | 22.2 | 25 | 485 | 70 | 555 |
| Clock | 36.0 | --- | 36.0 | 18 | 650 | --- | 650 |
| Churn | 6.0 | --- | 6.0 | 3 | 17 | --- | 17 |
| OTHER FARM SHOP USES: | | | | | | | |
| Air Compressor | --- | 3.0 | 3.0 | 35 | --- | 98 | 98 |
| Drill Press | 2.8 | 8.3 | 11.1 | 12 | 34 | 99 | 133 |
| Tool Grinder | 6.0 | 13.0 | 19.0 | 25 | 140 | 345 | 485 |
| Power Saw | 3.0 | 11.0 | 14.0 | 12 | 34 | 133 | 167 |
| Lathe | --- | 3.0 | 3.0 | 12 | --- | 34 | 34 |
| Soldering Iron | 8.3 | 5.6 | 13.9 | 15 | 124 | 84 | 208 |
| OTHER GENERAL PRODUCTIVE USES: | | | | | | | |
| Livestock Watering | 25.0 | --- | 25.0 | 180 | 4,500 | --- | 4,500 |
| Feed Mixer | 3.0 | --- | 3.0 | 12 | 34 | --- | 34 |
| Feed Chopper | --- | 3.0 | 3.0 | 12 | --- | 34 | 34 |
| OTHER DAIRY USES: | | | | | | | |
| Cream Separator | 19.4 | 2.8 | 22.2 | 35 | 679 | 98 | 777 |

| Appliance or Equipment | Percent of Consumers Using (1) | Planning To use (2) | Using and Planning To Use 1/ (3) | Annual Kwh Usage Per Unit 2/ (4) | Indicated Annual Kwh Usage Per 100 Farm Consumers: Present Use (5) | Future Use (6) | Total Indicated Future Use 3/ (7) |
|---|---|---|---|---|---|---|---|
| OTHER LIVESTOCK USES: | | | | | | | |
| Animal Clipper | 8.3 | 2.8 | 11.1 | 3 | 25 | 8 | 33 |
| Fence | 8.3 | 2.8 | 11.1 | 50 | 415 | 140 | 555 |
| TOTAL ANNUAL KWH USAGE PER 100 FARM CONSUMERS | | | | | 198,779 | 44,364 | 243,143 |
| ANNUAL KWH USAGE PER CONSUMER | | | | | 1,988 | 443 | 2,431 |
| MONTHLY KWH USAGE PER CONSUMER | | | | | 166 | 37 | 203 |

Source: Field Appraisal completed in November 1951.

1/ Percent of all served farm consumers who were using or planning to use electrical appliances and equipment listed within 3 years after the field appraisal as indicated by interviews with 36 respondents comprising an 8.5 percent random sample of all consumers selected from tabular lists.

2/ Annual kwh average usage as determined by REA. Annual data used to account for seasonal variations.

3/ The total indicated annual kwh usage shown in this column does not necessarily equal column 4 times column 3. Some consumers have, or plan to have, more than one of a particular appliance, or more than one of several different appliances.

## TABLE III

## PERCENT OF SERVED NONFARM CONSUMERS USING AND PLANNING TO USE ELECTRICAL APPLIANCES AND EQUIPMENT, APPLIANCE DENSITY, AND INDICATED ANNUAL KWH USAGE PER 100 NONFARM CONSUMERS WITHIN THREE YEARS AFTER THE DATE OF THE FIELD APPRAISAL

| Appliance or Equipment | Percent of Consumers Using (1) | Planning To Use (2) | Using and Planning To Use 1/ (3) | Annual Kwh Usage Per Unit 2/ (4) | Indicated Annual Kwh Usage Per 100 Nonfarm Consumers: Present Use (5) | Future Use (6) | Total Indicated Future Use 3/ (7) |
|---|---|---|---|---|---|---|---|
| MAJOR USES: | | | | | | | |
| House Lighting | 100 | --- | 100 | 240 | 24,000 | --- | 24,000 |
| General Barn Lighting | 6 | --- | 6 | 24 | 149 | --- | 149 |
| Poultry Laying House Lighting | 6 | --- | 6 | 35 | 217 | --- | 217 |

| Appliance or Equipment | Percent of Consumers Using (1) | Planning To Use (2) | Using and Planning To Use 1/ (3) | Annual Kwh Usage Per Unit 2/ (4) | Indicated Annual Kwh Usage Per 100 Nonfarm Consumers: Present Use (5) | Future Use (6) | Total Indicated Future Use 3/ (7) |
|---|---|---|---|---|---|---|---|
| MAJOR USES: (Cont'd) | | | | | | | |
| Yard Lighting | 6 | --- | 6 | 18 | 112 | --- | 112 |
| Other Buildings Lighting | 6 | --- | 6 | 12 | 74 | --- | 74 |
| Iron | 94 | --- | 94 | 100 | 9,380 | --- | 9,380 |
| Radio | 100 | --- | 100 | 100 | 10,000 | --- | 10,000 |
| Refrigerator | 75 | 25 | 100 | 360 | 29,232 | 9,000 | 38,232 |
| Range | --- | 6 | 6 | 1,200 | --- | 7,440 | 7,440 |
| Washing Machine | 88 | --- | 88 | 35 | 3,062 | --- | 3,062 |
| Pres. System-Lift 22' or Less | 12 | --- | 12 | 180 | 2,250 | --- | 2,250 |
| Pres. System-Lift Over 22' | 6 | --- | 6 | 240 | 1,488 | --- | 1,488 |
| Space Heater (Supplementary) | 6 | --- | 6 | 70 | 434 | --- | 434 |
| Water Heater | 6 | --- | 6 | 3,000 | 18,600 | --- | 18,600 |
| OTHER HOUSEHOLD USES: | | | | | | | |
| Sewing Machine | 6 | --- | 6 | 10 | 62 | --- | 62 |
| Household Fan | 6 | --- | 6 | 15 | 93 | --- | 93 |
| Vacuum Cleaner | --- | 12 | 12 | 20 | --- | 250 | 250 |
| Heating Pad | 12 | --- | 12 | 3 | 38 | --- | 38 |
| Hot Plate | 25 | --- | 25 | 70 | 1,750 | --- | 1,750 |
| Percolator | 12 | --- | 12 | 60 | 750 | --- | 750 |
| Toaster | 38 | 12 | 50 | 35 | 1,330 | 420 | 1,750 |
| Waffle Iron | 12 | 6 | 18 | 25 | 325 | 145 | 470 |
| Food Mixer | --- | 6 | 6 | 25 | --- | 155 | 155 |
| Clock | 18 | --- | 18 | 18 | 450 | --- | 450 |
| OTHER FARM SHOP USES: | | | | | | | |
| Drill Press | 6 | --- | 6 | 12 | 74 | --- | 74 |
| Power Saw | 12 | --- | 12 | 12 | 150 | --- | 150 |
| Soldering Iron | 6 | --- | 6 | 15 | 93 | --- | 93 |
| Sander | 6 | --- | 6 | 15 | 93 | --- | 93 |
| TOTAL ANNUAL KWH USAGE PER 100 NONFARM CONSUMERS | | | | | 104,206 | 17,410 | 121,616 |
| ANNUAL KWH USAGE PER CONSUMER | | | | | 1,042 | 174 | 1,216 |
| MONTHLY KWH USAGE PER CONSUMER | | | | | 87 | 14 | 101 |

Source: Field appraisal completed in November 1951.

Footnotes 1/, 2/ and 3/ the same as for Table II except the consumers were nonfarm and there were 16 interviews comprising an 8.5 percent sample of all consumers.

C. Evaluation of Indicated Consumption

As shown previously, a sample of the estimated 150 potential consumers indicated they would use 1,091 kwh yearly (91 per month) in 3 years. This amount is nearly as high as that expected to be consumed by the presently served nonfarm residentials and is nearly 25 percent above the actual average attained by the farm consumers over a 12-year period. It was quite apparent to the appraiser that consumers in this area were not using electrical energy at the average rate for the entire country as determined by REA. Part of the explanation for this is that the people are frugal. They use only what they absolutely need. Also, the large number of appliances that were discovered to be in the possession of farmers but not used for want of repair had a substantial effect on the amount of energy used. Unless these factors are corrected, it is probable that potential consumers will only attain about 80 percent of what they indicated they would use in 3 years and that consumers already connected will have a future indicated consumption of as much as 20 percent less than shown in Table I.

D. Percentage Distribution of Consumers According to Amount of Electricity Indicated to be Used

The following is a percentage distribution of consumers according to the amount of electricity they indicated they expected to use.

| Average Monthly Consumption | Percent in Class | |
|---|---|---|
| | Farm | Nonfarm |
| Under 50 | 3 | -- |
| 50 - 99 | 47 | 75 |
| 100 - 199 | 22 | 19 |
| 200 - 299 | 6 | 6 |
| 300 - 399 | 6 | -- |
| 400 - 499 | 8 | -- |
| 500 and over | 8 | -- |

The above distribution is to be expected in 3 years provided consumers' intentions are fulfilled and that they consume energy at the same rate as the average usage for the entire country as determined by REA.

E. Major Uses of Electricity According to Total Kwh Consumption For Served Farm and Nonfarm Residential Consumers

The more important kinds of electrical appliances and equipment according to total kwh load to be attained within 3 years after the field appraisal are indicated in Table IV. It should be noted that for farm consumers the appliances shown will account for about 83 percent

of the entire consumption; for nonfarm residential consumers the appliances shown will account for about 88 percent.

TABLE IV

MAJOR USES OF ELECTRICITY ACCORDING TO PERCENT OF TOTAL USAGE BY CLASS OF CONSUMER

| Appliance or Equipment | Farm Consumers | | Nonfarm Consumers | |
|---|---|---|---|---|
| | Estimated Total Kwh | Percent of Total Load | Estimated Total Kwh | Percent of Total Load |
| Water Heaters | 50,100 | 20.6 | 18,600 | 15.3 |
| Refrigerators | 33,012 | 13.6 | 38,232 | 31.4 |
| Ranges | 30,000 | 12.3 | 7,440 | 6.1 |
| Battery Brooders | 28,000 | 11.5 | --- | --- |
| House Lighting | 24,000 | 9.9 | 24,000 | 19.7 |
| Cabinet Freezers | 15,030 | 6.2 | --- | --- |
| Radios | 10,560 | 4.3 | 10,000 | 8.2 |
| Irons | 10,000 | 4.1 | 9,380 | 7.7 |

Source: Tables II and III.

F. Other Aspects of Future Use of Electricity

Generally speaking, low voltage and frequent outages that prevailed about 2 years ago, and especially prior to the agreement with Virginia 11 Rockingham, had a serious effect on farmers' acceptance of electricity for chick brooding, water heating and cooking. Although service is substantially better now insofar as outages are concerned, low voltage still remains a problem in some areas.

Increased voltage in the right places, coupled with a good reputation for minimum interruptions in service, will do much to increase the consumption of electricity in this area. To implement this, a program of education would seem necessary. Farm consumers presently using electricity to brood chicks or poults might be used as demonstration farms.

This cooperative will need more than just an increasing load to improve its condition. Some means should be used to keep the members informed of their cooperative's activities. A news letter would help.

A substantial amount of the present potential load has not been realized in this area because a large number of appliances owned by the consumers are out of order. It does not appear that farmers will spend the time or effort required to take them to a repair shop. Positive action should be taken to help farmers repair these appliances. A roving appliance expert may solve the problem or pamphlets on repair of appliances if distributed to members may be of help.

## V. FACTORS RELATED TO FUTURE CONSUMPTION OF ELECTRICITY

### A. Trend in Consumption

The following are data which show the trend in average number of consumers and their average monthly consumption for this cooperative since energization.

AVERAGE NUMBER OF FARM CONSUMERS
AND AVERAGE KWH USAGE--1939 THROUGH 1950 1/

| Year | Farm Consumers | |
|---|---|---|
| | Average Number | Average Monthly Consumption |
| 1939 | 56 | 30 |
| 1940 | 173 | 29 |
| 1941 | 205 | 34 |
| 1942 | 224 | 40 |
| 1943 | 237 | 49 |
| 1944 | 257 | 49 |
| 1945 | 294 | 48 |
| 1946 | 335 | 48 |
| 1947 | 368 | 55 |
| 1948 | 419 | 66 |
| 1949 | 462 | 69 |
| 1950 | 478 | 77 |

1/ Source: Monthly Operating Reports submitted to REA by the system.

### B. Relationship Between Kwh Consumption of Served Consumers (Excluding Small Commercials) and Number of Years Receiving Service

The actual kwh consumption of all served consumers (exclusive of small commercials), as shown by the billing record data for 41 of the 52 respondents, is shown below. Billing record data for the other 11 respondents were incomplete or they had not been connected at least six months in one calendar year.

| Total No. of Years With Electricity | Number of Schedules | Average Monthly Kwh Consumption by 12-Month Period 1/ | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th | 12th | 13th |
| 1 | 7 | 27 | | | | | | | | | | | | |
| 2 | 2 | 74 | 77 | | | | | | | | | | | |
| 3 | 7 | 55 | 56 | 59 | | | | | | | | | | |
| 4 | - | -- | -- | -- | -- | | | | | | | | | |
| 5 | 5 | 30 | 33 | 51 | 62 | 68 | | | | | | | | |
| 6 | 1 | 35 | 45 | 54 | 67 | 88 | 92 | | | | | | | |
| 7 | 2 | 24 | 23 | 21 | 45 | 35 | 46 | 46 | | | | | | |
| 8 | 1 | 41 | 17 | 33 | 28 | 28 | 28 | 68 | 28 | | | | | |
| 9 | - | -- | -- | -- | -- | -- | -- | -- | -- | -- | | | | |
| 10 | 3 | 18 | 125 | 65 | 56 | 54 | 86 | 99 | 157 | 222 | 123 | | | |
| 11 | 1 | 27 | 27 | 31 | 29 | 30 | 41 | 57 | 65 | 63 | 59 | 47 | | |
| 12 | 6 | 29 | 35 | 39 | 56 | 47 | 49 | 53 | 72 | 87 | 113 | 110 | 149 | |
| 13 | 6 | 33 | 33 | 32 | 41 | 41 | 39 | 45 | 47 | 55 | 80 | 68 | 147 | 136 |

1/ The first year's usage was determined from the average monthly kwh consumption for consumers connected 6 or more months at the end of the year. The last year's usage was determined from the average monthly kwh consumption for consumers who were receiving service during the first 10 months of 1951.

C. Rates

The cooperative has the following schedule of rates now in effect:

| | |
|---|---|
| First 40 kwh | 7 cents |
| Next 40 kwh | 5 cents |
| Next 120 kwh | 2.5 cents |
| All over 200 kwh | 1.75 cents |
| Minimum bill is | $2.00 |

A commercial power company operating in areas interspersed about the cooperative's service area has the following schedule of rates:

| | |
|---|---|
| First 50 kwh | 5.8 cents (net), 6.3 cents (gross) |
| Next 100 kwh | 4 cents |
| Over 150 kwh | 2 cents |

In addition, a special rate is given for water heating of 1.25 cents which operates off-peak.

From a comparison of these two rate schedules it may be noted that a consumer using 130 kwh per month or more, excluding use of electricity for water heating, would find it less expensive to be served by the cooperative.

D. Liquid Petroleum Gas Competition

Thirteen percent of the respondents in the survey indicated they were using LP gas. (See lower part of Figure V.) There was little indication that consumers not now using LP gas would do so in the immediate future. Nor would electricity be used in those cases where additional energy may be required. In short, it was noted that wherever possible, wood would be used. This applies particularly to brooding chickens and for cooking and heating. Further, those using LP gas generally do not plan to change to electricity, at least not until the appliances which are now being used are worn out.

Of those using or planning to use gas, all were using it for cooking, and some used it for water heating, chick brooding and refrigeration.

LP gas retails at 9 dollars per 100 pounds in the area. A 25 dollar installation fee is also charged, but some dealers make concessions to those users who appear to have large potential use for gas. The valve for the tank is an important part of the installation cost.

## VI. RELATED ECONOMIC FACTORS

### A. Trend in Population, Number of Dwelling Units and Number of Farms

In 1950 the population of the service area was .5 percent of the total population of West Virginia. In 1940 the comparison to the State population was .6 percent. During that 10-year period, the population of the area decreased 7.4 percent while the population of the State increased 5.1 percent.

Population, Dwelling Units and Persons Per Dwelling Unit
1940 and 1950

| | Population | | | Dwelling Units | | | Persons Per Unit | |
|---|---|---|---|---|---|---|---|---|
| | 1940 | 1950 | Percent Change | 1940 | 1950 | Percent Change | 1940 | 1950 |
| Hardy County 1/ | 10,813 | 10,013 | - 7.4 | 2,453 | 2,686 | + 9.5 | 4.4 | 3.7 |
| Moorefield | 1,291 | 1,401 | + 8.5 | --- | --- | --- | --- | --- |
| Wardensville | 195 | 171 | -12.3 | --- | --- | --- | --- | --- |
| City of Winchester, Virginia 2/ | 12,095 | 13,841 | +14.4 | 3,390 | 4,369 | +28.9 | 3.5 | 3.2 |

1/ Towns are included.
2/ City outside service area within radius of 75 miles.

As is indicated by the table, Hardy County has lost population over the last 10 years. The county seat, Moorefield, gained population and was one of the few exceptions to the general trend.

The number of dwelling units in the county increased during the 10-year period with the result that there are fewer persons per unit in 1950, as compared with 1940.

On April 1, 1950, there were 1,124 farms reported in Hardy County, a decrease of 15 percent under the number reported in 1945. In 1950 farms averaged 199 acres. Only 10 percent of the land in farms was used to produce crops.

B. Type of Farming

Poultry farming is the most predominant type in Hardy County. According to the county agent, farmers in the county raised more than 6 million broilers and more than 280,000 turkeys in 1951. According to the 1950 Census of Agriculture, poultry products accounted for 75 percent of the value of farm products sold, which amounted to nearly 6 million dollars in 1949. Second in importance to poultry is beef cattle. Sheep, hogs and goats are also raised. Some field crops are raised but they are limited to the valleys, especially along the South Branch of the Potomac, in the Lost River area and Capon Valley. Although not recognized as a principal type of farming, the county agent stated that there are approximately 60 dairy herds producing Grade A milk and another 125 farms from which cream is marketed. At present dairy farmers are organizing an artificial insemination ring.

C. Farm Financial Pattern

1. Value of Land and Buildings

During the last 5 years few desirable farms have been sold in Hardy County. If change is made, it is a paper change, most common of which is the settling of an estate. Farms in the South Branch area sell extremely high. One 206-acre farm with no buildings except a first-class farm house sold for 20,500 dollars. Another farm of 450 acres, 175 of which are tillable, now is advertised for 25,000 dollars. Only a few years ago the present owners secured it for 15,000 dollars.

According to the 1950 Census of Agriculture, the average value of farm land in Hardy County was $35 per acre in 1949. This was 36 percent above the average per acre value in 1944.

2. Savings and Amounts of Savings

Farmers in the South Branch area are very well off according to town businessmen in Moorefield. A few farm operators in the area are estimated to be worth as much as 300,000 dollars.

According to the 1951 Rand McNally Bank Directory, there are two banks in Hardy County, one at Moorefield and the other at Wardensville. Total deposits in 1950 reached 2.7 million dollars.

3. Farm Income

The average cash farm income was 5,307 dollars for 1949. This was 422 percent higher than the average cash income for the State during the same period. In spite of this high average, it should be noted that almost one-third of the farms in the area had incomes of less than 1,500 dollars during 1949.

Feed dealers have taken the lead in providing financing for the development of the poultry enterprises in Hardy County. There are 5 companies operating in the area and it is estimated that between 800 and 1000 farmers have entered into contractual agreements with the feed companies to raise broilers, Beltsville turkeys or Bronze turkeys.

Feed dealers carry the account of a farmer under such an agreement, providing him with the chicks or poults, inoculations, feed, fuel (if coal or gas) and any other expenses incidental to raising the flock. The farmer provides housing, other physical equipment as hoppers, waterers and stoves, and provides the labor and management. When broilers reach about 3 pounds (around 10 weeks old) or poults weigh about 9 pounds, the feed dealer finds a buyer and the entire flock is sold. Feed dealers receive 10 percent of the net (an alternative is 2¢ per chick) for chicks and 25 percent in the case of poults. This amount received by the feed companies is reserved for losses. The farmer does not stand the financial loss if such occurs; however his time and the use of the physical facilities would be lost. The feed companies on the other hand will have made their margins on the feed and other things sold to the farmers over the period. Farmers try to be good managers, for a loss on one flock would make it difficult to enter into a subsequent agreement.

As many as four or five flocks are raised yearly depending upon many factors. The business continues throughout the 12 months of the year.

4. Other Income

Farmers in the area find off-farm employment in Moorefield, Petersburg, and Wardensville, West Virginia, and in Winchester, Virginia. A few travel to their work in Baltimore, Maryland. Off-farm employment in the area is confined generally to poultry processing, hauling, tannery mills, flooring mills and logging. The 1950 Census of Agriculture indicated that 48 percent of the farm operators reported off-farm employment. Almost one quarter indicated that they had worked off-farm for 100 days or more during 1949.

D. Improvements and Facilities

On April 1, 1950, 70 percent of the farms in the area were electrified as compared with 50 percent in 1945. Thirty-one percent had telephones, 28 percent electric water pumps, and 8 percent water heaters. Forty-three percent of the farmers lived alongside a hard-surfaced or all-weather road. More than one-half of the farmers had one or more trucks, 40 percent had one or more tractors, and 61 percent had one or more autos. Compared with the State, Hardy County increased 18 percent above the over-all increase in level of living during the period from 1940 to 1945, and this trend apparently is continuing.

The county agent reported that he was endeavoring to help organize a telephone cooperative. According to him, people in the area need good service. On the present system, people at Moorefield (the county seat) can call Baker, Petersburg and Wardensville, but they cannot use the telephone to communicate with Lost City, Lost River or Kessel. Service in rural areas is described as very poor. Telephones at present are crank type magneto exclusively.

E. Marketing Facilities and Outlets

Marketing facilities and outlets are good and appear to be better to an outsider than what might be expected. There is an adequate network of hard-surfaced roads. Back roads are bad and make the marketing of produce from the remotely located farms quite difficult.

Hucksters and other dealers are readily available to buy up any poultry or livestock. Milk and cream are marketed by trucks or by train. The Baltimore and Ohio Railroad runs through Moorefield and provides rail connections with Cumberland, Maryland.

A privately operated livestock auction handles up to 300,000 dollars in volume weekly at its sale held each Wednesday evening. At the time the appraiser was there, an estimated 200 persons were on hand with many participants. Hereford heifer calves weighing about 400 pounds were bringing 32 cents per pound; other heifers including yearlings, usually much more rangy, were averaging about 22 cents.

VII. PHYSICAL CHARACTERISTICS OF THE AREA

A. Topography and Soils

The area lies in the Central Appalachian soil region. The land is rough, mountainous terrain alternating with rolling valleys. Light-colored, well-drained soils prevail. The South Branch of the Potomac River runs in a northerly direction through Moorefield and empties into the Potomac at a point about 40 miles east of Cumberland, Maryland. The eastern boundary of Hardy County is bordered by the Great North Mountains.

Except for the valleys, land use is confined to poultry raising, grazing and forestry. The Huntington silt loam prevails in the valleys, particularly in the South Fork and Lost River areas, while the DeKalb, a high type of shale, forms the base for the upland areas. The area in the vicinity of Rig is regarded as having the poorest quality of soil in the county.

B. Climate

According to data recorded at the Moorefield station over a 34-year period, the growing season averaged 156 days; frost-free dates were May 1 to October 4. The maximum temperature recorded was 112°, the minimum, -27°. The average annual precipitation was slightly over 32 inches with about one-half of this falling from April 1 through September. Winters are moderate to rigorous and only occasionally severe in the mountains. Cold waves occur on an average of 3 times during the winter but severely cold spells as a rule last only 2 or 3 days. The summers are usually warm in the low valleys and rather mild in the mountains.